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on the Basis of External Fine Features

Kim, Byung Jin

Dept. of Molecular Biology, Won Kwang Univ., Iri City 510, Korea

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On the Unrecorded Species of Korean Ants, *Formica fusca* on the Basis of External Fine Features

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走査電子顯微鏡을 利用한 韓國産 불개미 1 未記錄種 Formica fusca의 分類學的 研究

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摘 要

著者は 韓國産 개미류의 走査電子顯微鏡의 形質을 分析하던 중에 불개미 1 未記錄種이 發見되었기
에 보고하며 外部微細形態學的 形質을 分類學的 形質로 삼아서 再記載하였다. 이번에 韓國産 불개미
1 種 *Formica fusca*가 추가되어 韓國産 불개미屬은 11 種으로 整理된다.

INTRODUCTION

The primary purpose of this paper is to re-describe one unrecorded species, *Formica fusca* on the basis of external fine features. *Formica* ants of Korea have been listed several times. Ten species of *Formica* ants were hitherto recorded from Korea; Five species were added to Korean fauna by Kim(1963, 1970) in the "List of Korean Hymenoptera" and "the Illustrated of Fauna and Flora of Korea, Insecta III," two species *Formica lemani* and *Formica japonica* by C.W. Collingwood (1976, 1981) and two species *Formica transcaucasica* and *Formica truncorum* were also recorded by Kim and Kim(ENT. RES. Bulletin, 9: 57 ~ 67, 1983). Reexamining collections collected from Cheju-do province, author has found

one unrecorded species, *Formica fusca* and the Korean fauna of genus *Formica* therefore includes eleven species

MATERIALS and METHODS

During the summer of 1985 sixteen individuals were collected from Mt. Hallasan of Cheju-do province. All collected materials were fixed in alcoholic Bouin's solution for two or three days and removed to 85 % ethanol to be preserved. These materials were identified under the stereo zoom microscope(CITOVAL 2 of Carl Zeiss) and external fine features were analyzed by scanning electron microscope and redescribed according to the taxonomic external fine structural characters under SEM(Jeoul JSM T-300)

* 圓光大學校 分子生物學科

REDESCRIPTION

Formica fusca Linnaeus, 1758 : Syst Nat., 1 : 580(1758)

Formica glebaria Nylander, 1846(non Forel, 1904)

Formica fusca var. *fusca* ; Forel, 1874

Formica fusca fusca var. *pollipes* Kuznetsov - Ugamskij, 1926 (syn. nov.)

Formica fusca var. *rufipes* ; Stitz, 1930 (syn. nov.)

Whole body with abundant, dense minute pubescence without any erect hairs except frons, clypeus and mandibles. (fig.1)

Vertex : abundant, minute, dense pubescence on the netformed rugosities, ocelli distinct and protruded fairly without pubescence on the area around them. (fig.3,4)

Frons : minute, downward hairs on the net formed rugosities, longitudinal central line connecting to frontal triangle furrowed comparatively, but without minute hairs, erect hairs on the marginal lines. (fig.7)

Frontal triangle : much horizontal rugosities and more or less sparse downward pubescence except marginal area. (fig.7)

Clypeus : protruded central ridge with longitudinal rugosities, slopes with net-formed rugosities and minute pubescence, erect hairs distributed on each slopes here and there, anterior margin uneven and thin erect hairs on the anterior margin longer than that of upper or middle area. (fig.7,8)

Mandibles : numerous horizontally protruded rugosities and sparse long sharp hairs on the external surface, end piece of teeth unsharpened.

Antennae : abundant pubescence on the whole surface. (fig.2)

Compound eye : hexagonal but longer than width, with dull erect hairs sparsely distributed between ommatidium external surface around the compound eye protruded like islands by net formed furrow. (fig.5,9)

Thorax : pronotum, mesonotum, metanotum and propodeum with numerous pubescence and minute net formed sculpture, lower episternum of prothorax without pubescence.

Metathoracic spiracles : basal area like a pine cone protruded extremely and located on the branching point between mesonotum, metanotum, episternum of metathorax and propodem furrowed by them. An entrance of air small and spiral without pubescence or erect hairs.

Propodeal spiracles : circumference of entrance protruded fairly without any rugosities or pubescence, with filtering apparatus on the inner area of the entrance.

Petiole : with much minute pubescence, without any erect hairs.

Abdomen : gaster of 1st and 2nd segment with numerous pubescence and short erect hairs here and there, posterior marginal area of 1st segment with irregular minute sculpture and short erect hairs. Anterior area of 2nd segment with horizontally sculptured rugosities without any pubescence or erect hairs. Erect hairs of posterior marginal area of 1st segment distributed regularly along to the marginal line.

Body length : 4.5 ~ 7.0 mm

SPECIMEN EXAMINED

Paengnoktam, Cheju-do, 17 workers, 26.VIII. 1985;
Sanpangkulsa temple, Cheju-do, 8 workers, 27.VIII. 1985 ; Kōmundo Is., Chollanam-do, 14.VII. 1986. B. J. Kim.

Distribution : Denmark, Southern Fennoscandia, Germany, Japan.

DISCUSSION

In the present paper author found the following characters, which were redescribed on the basis of external fine features

Table.1 Comparative characters between stereomicroscope and SEM

Characters	Under Stereomicro -scope	Under SEM
Surface of Body	body color greyish	minute pubescence on the whole body
Frontal triangle	flat surface	horizontal sculptured rugosities and sparse downward pubescence.
Metathoracic Spiracles	entrance unconfirmed	entrance of air small and spiral
Propodeal spiracles	ovum formed	entrance with filtering apparatus
Abdomen	greyish colour, external surface unconfirmed	gaster of 1st segment with irregular sculptured rugosities.

SUMMARY

While authors were analyzing scanning electron microscopic characters of the abundant ants collected from the several islands around the peninsula of Korea, one unrecorded species of Korean *Formica* was found; *Formica fusca*.

In the present paper it was redescribed on the basis of external fine features using scanning electron microscope. If it is added to fauna of Korean *Formica*, total species of genus *Formica* is eleven.

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EXPLANATION OF FIGURES

Fig. 1. Dorsal view of whole body photographed
by SEM. × 22

Fig. 2. Flagellum of antennae. × 31

Fig. 3. Dorsal view of vertex. × 92

Fig. 4. Anterior-dorsal view of vertex. × 92

Fig. 5. Frontal view of compound eyes. × 920

Fig. 6. Frontal view of clypeus. × 124

Fig. 7. Frontal view of frons and frontal
triangle. × 124

Fig. 8. Frontal view of mandible. × 124

Fig. 9. Frontal view of surface around the
compound eye. × 1243

Fig. 10. Lateral view of thorax. × 46

Fig. 11. Dorsal view of thorax. × 46

Fig. 12. Frontal view of metathoracic spiracle. × 460

Fig. 13. Frontal view of propodeal spiracle. × 1243

Fig. 14. Dorsal view of abdomen. × 31

Fig. 15. Lateral view of abdomen. × 31

Fig. 16. Frontal view of gaster of 1st and 2nd
abdominal segments. × 223



